

THAT WHICH IS CLAIMED IS:

1. A multimode wavelength division multiplexing (WDM) network transceiver comprising:
a plurality of optical transmitters transmitting optical communications signals along respective signal paths;

a multiplexer operatively connected to each optical transmitter for receiving the optical communications signals and multiplexing the optical communications signals into a multimode wavelength division multiplexed optical communications signal having a wavelength channel spacing less than about 1,000 gigahertz;

15 a demultiplexer for receiving a multimode
wavelength division multiplexed optical communications
signal and demultiplexing the signal into a plurality
of demultiplexed optical communications signals; and
a plurality of optical receivers each matched
with a respective optical transmitter for receiving and
detecting the demultiplexed optical communications
20 signal.

2. A network transceiver according to Claim 1, wherein said optical receiver comprises a PIN detector.

3. A network transceiver according to Claim 2, wherein said PIN detector comprises an InGaAs PIN detector.

4. A network transceiver according to Claim 2, wherein said optical receiver further comprises a transimpedance amplifier.

6. A network transceiver according to Claim 4, wherein said APD comprises an InGaAS APD detector.

8. A network transceiver according to Claim 7, wherein said optical transmitter comprises a thermoelectric cooler and controller circuit.

10. A network transceiver according to Claim 9, and further comprising a single mode optical fiber defining a signal channel between said attenuator and said optical transmitter and an optical fiber defining signal channel between said attenuator and said multiplexer.

11. A network transceiver according to Claim 1, and further comprising a transceiver electrically connected to each optical transmitter and matched optical receiver for receiving and transmitting an optical communications signal, wherein said transceiver is operative at a first wavelength band and

said optical transmitter and matched optical receiver are operative at a second wavelength band.

12. A network transceiver according to Claim 11, wherein said second wavelength band is upconverted from said first wavelength band.

13. A network transceiver according to Claim 1, and further comprising a physical sublayer chip circuit operatively connected to a plurality of optical transmitters and matched optical receivers.

14. A network transceiver according to Claim 13, and further comprising an electrical interface operatively connected to said physical sublayer chip circuit.

15. A network transceiver according to Claim 14, wherein said electrical interface comprises a plurality of RJ-45 jacks for Ethernet 1000 Base-T connection.

16. A network transceiver according to Claim 1, and further comprising a serial/deserializer (SERDES) circuit operatively connected to an optical transmitter and matched optical receiver, a switch circuit operatively connected to said serial/deserializer circuit, and a physical sublayer chip circuit and electrical interface operatively connected to said switch circuit.

17. A network transceiver for processing optical communications signals into a wavelength division multiplexed optical communications signal comprising:

an optical receiver operatively connected to
25 the demultiplexer and each respective transceiver for
receiving and detecting a demultiplexed optical
communications signal and generating a signal to a
respective transceiver to be output as an optical
communications signal contained within the first
30 wavelength band.

19. A network transceiver according to Claim 18, wherein said PIN detector comprises an InGaAs PIN detector.

20. A network transceiver according to Claim 18, wherein said optical receiver further comprises a transimpedance amplifier.

21. A network transceiver according to Claim 17, wherein said optical receiver comprises an Avalanche Photo Diode (APD).

22. A network transceiver according to Claim 21, wherein said APD comprises an InGaAS APD detector.

23. A network transceiver according to Claim 17, wherein said optical transmitter comprises a distributed feedback laser.

24. A network transceiver according to Claim 17, wherein said optical transmitter comprises a thermoelectric cooler and controller circuit.

25. An network transceiver according to Claim 17, wherein each transmitter is operative for transmitting the optical communications signal contained within a second wavelength band onto a single
5 mode fiber output.

26. A network transceiver according to Claim 17, and further comprising a single mode optical fiber defining a signal channel between said attenuator and said optical transmitter and an optical fiber
5 defining a signal channel between said attenuator and said wavelength division multiplexer.

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30. A multiport network hub according to Claim 29, wherein said optical receiver comprises a PIN detector.

31. A multiport network hub according to Claim 30, wherein said PIN detector comprises an InGaAS PIN detector.

32. A multiport network hub according to Claim 29, wherein said optical receiver comprises an Avalanche Photo Diode (APD).

33. A multiport network hub according to Claim 32, wherein said APD comprises an InGaAS detector.

34. A multiport network hub according to Claim 30, wherein said optical receiver further comprises a transimpedance amplifier.

35. A multiport network hub according to Claim 29, wherein said optical transmitter comprises a distributed feedback laser.

36. A multiport network hub according to Claim 29, wherein said optical transmitter comprises a thermoelectric cooler and controller circuit.

37. A multiport network hub according to Claim 29, wherein said network interface is operative with an Ethernet infrastructure.

38. A multiport network hub according to Claim 37, wherein said network interface comprises a plurality of RJ-45 jacks.

39. A multiport network hub according to Claim 29, and further comprising a serial/deserializer (SERDES) interface circuit operatively connected between each of an optical transmitter and matched optical receiver and the switch circuit.

40. A multiport network hub according to Claim 29, wherein said network interface further comprises octal physical sublayer chip circuits.

41. A multiport network hub according to Claim 29, wherein a channel spacing is less than about 1,000 gigahertz.

42. A method of expanding the bandwidth of an existing optical communications network comprising the steps of:

transmitting optical communications signals from a plurality of optical transmitters positioned along respective signal channels;

multiplexing the optical communications signals into a multimode wavelength division multiplexed optical communications signal having a channel spacing less than about 1,000 gigahertz;

demultiplexing a multimode wavelength division multiplexed optical communications signal within a demultiplexer into a plurality of optical communications signals along respective signal channels; and

receiving and detecting the plurality of optical communications signals within optical receivers that are respectively matched with optical transmitters.

44. A method according to Claim 43, wherein the PIN detector comprises an InGaAS detector.

45. A method according to Claim 42, wherein the step of transmitting comprises the step of generating an optical communications signal with a distributed feedback laser.